

GUIDELINES FOR POTABLE WATER REUSE: IS GEORGIA READY TO ADDRESS WHAT IS ALREADY HAPPENING?

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Abstract. Over two years ago a group of utility staff, regulators, environmentalists, agricultural interests, and concerned citizens formed the Georgia Potable Water Reuse Task Force. The purpose of the group was to identify the issues related to the current practice of unplanned indirect potable water reuse, and to (if possible) provide guidelines as a framework for planned potable water reuse in the future. The group researched the available data on potable water reuse, talked with leaders in the reuse field, and discussed issues specific to Georgia. The resulting product was Draft Guidelines for Potable Reuse, which was submitted to GAEPD for review in 1998. This paper describes the strategy, content, and approach for these guidelines.

INTRODUCTION TO WATER REUSE

Water reuse, or the transformation of wastewater into a valuable water resource to meet water supply needs, can take any of several forms (McEwen, 1995; Georgia Potable Reuse Task Force 1998).

- “nonpotable” reuse (irrigation, dual systems, wetlands replenishment, etc.)
- “discharge to water supply” reuse (planned or unplanned effluent discharges into lakes and rivers used for drinking water supplies)
- “blend pond” reuse (effluent discharges to holding ponds, where it is then mixed with raw water from a water supply source before treating at a water treatment plant)
- “water treatment plant” reuse (effluent discharges directly to the headworks of a water treatment plant, along with an additional percentage of total inflow from a water supply source)
- “pipe-to-pipe” reuse (effluent returned directly to a drinking water distribution system)

Which forms of water reuse are most appropriate to meet the water resources needs of a community is based on the specific characteristics of the community, the regional water resources, geography, hydrography, climate, soils,

water quality, regulatory requirements, public preferences, and other factors. Based on these needs, water reuse can help (Hall 1997)

- preserve and augment water supplies
- protect water quality
- protect instream habitats
- restore instream low flows
- promote recreation and stable lake levels.

There are currently adequate guidelines in Georgia, and many other states, for nonpotable urban water reuse. Therefore the focus of this effort has been on the development of guidelines for potable reuse.

DRAFT GUIDELINES FOR POTABLE REUSE

This section summarizes the fourth draft of the Guidelines for potable reuse. This draft is currently under review by the Georgia EPD.

Definitions

Reclaimed Water. Wastewater that has been treated at a water treatment facility beyond secondary treatment requirements and suitable for release or reuse.

Water Reclamation Facility. A wastewater treatment facility providing treatment beyond minimum secondary requirements.

Effluent. See Reclaimed Water. Treated wastewater suitable for release or reuse.

Potable Water Reuse. The use of reclaimed water to augment potable water supplies. Potable refers to water that is suitable for human consumption and other purposes following appropriate treatment.

Raw Water. Water from water supply sources prior to treatment at a potable water treatment plant.

Potable Water Treatment Plant. Facility for treating potable water supplies to meet Safe Drinking Act standards prior to delivering to the customer for potable and other uses.

Discharge to Water Supply Reuse. Potable water reuse augmenting waters classified as drinking water supplies

with reclaimed water of sufficient quality to protect and/or enhance the potable water supply.

Blend Pond Reuse. Potable water reuse whereby reclaimed water is mixed in a dedicated reservoir (or storage vessel) with raw water from a potable water supply source. The blended water is then treated at a potable water treatment plant.

Water Treatment Plant Reuse. Potable water reuse whereby reclaimed water is delivered directly to a potable water treatment plant, along with an additional percentage of the total inflow from a potable water supply source. The blended water is then treated at the potable water treatment plant.

Pipe-to-Pipe Reuse. Potable water reuse whereby reclaimed water is delivered directly into the potable water distribution system for delivery to customers.

Types of Potable Water Reuse

Inasmuch as water supplies should be conserved and protected, this document provides guidelines for potable water reuse. Potable water reuse refers to the use of reclaimed water to augment potable water supplies.

Four types of potable water reuse are described in this document: (1) *discharges to water supply reuse* entails discharge to surface water bodies or tributaries which are classified as drinking water supply, or groundwater potable supply sources. The effluent discharges to receiving waters must protect the designated uses of the water source; (2) *blend pond reuse* limits the percentage of reclaimed water to the total water from all sources in a dedicated reservoir to not more than 30% and at least 30 days retention time; (3) *water treatment plant reuse* sends reclaimed water to the water treatment plant at not more than a 15% portion of total inflow to the water treatment plant; (4) *pipe-to-pipe reuse* sends reclaimed water directly to the potable water distribution system.

WATER RECLAMATION TREATMENT FOR POTABLE WATER REUSE

Multiple Barriers

All reclaimed water destined for potable water reuse, or discharged upstream of water intake in the same segment (or sub-area of impoundment) as the water intake must meet advanced treatment limits with multiple barriers and a high level of disinfection.

The following parameters are considered to be controlled by the treatment barriers as indicated.

Treatment Barriers	Suspended Solids	Pathogens	Metals	Total Organic Carbon
Biological Nutrient Removal	X	X	X	X
Chemical Assistant Coagulation-Sedimentation	X	X	X	X
Granular Media Filtration	X	X		
Carbon Adsorption				X
Micro or Ultrafiltration	X	X		
Nanofiltration or Reverse Osmosis	X	X	X	X
Disinfection (ozonation, UV, chlorination, etc)		X		

The following numbers of treatment barriers will be continuously operated for water reclamation facilities supporting potable water reuse as indicated in the General Section above.

Potable Water Reuse Mode	Suspended Solids	Pathogens	Metals	Total Organic Carbon
Discharge to Water Supply	2	3	1	2
Blend Pond	3	4	2	3
Water Treatment Plant	4	5	3	4
Pipe-to-Pipe	5	6	3	4

Process Control Criteria

Reclaimed water which fails the turbidity, TOC or total coliform requirements stated in this Section shall be rejected for that particular use.

Turbidity: The maximum allowable sampling interval for turbidity and the maximum allowable turbidity limits for the reclaimed water are specified as follows:

RELIABILITY

Potable Water Reuse Mode	Maximum Sampling Interval	Maximum Limit for Turbidity
Discharge to Water Supply	4 hours	5.0 TU (any sample)
Blend Pond	Continuous	0.3 TU (daily average)
Water Treatment Plant	Continuous	0.1 TU (daily average)
Pipe-to-Pipe	Continuous	0.1 TU (daily average)

Total Organic Carbon (TOC): The maximum allowable sampling interval for TOC and the maximum allowable TOC limits for the reclaimed water are specified as follows:

Potable Water Reuse Mode	Maximum Sampling Interval	Maximum Limit for TOC
Discharge to Water Supply	Daily	10 mg/L (monthly ave.)
Blend Pond	8 hours	1 mg/L (daily average)
Water Treatment Plant	Continuous	0.5 mg/L (instantaneous)
Pipe-to-Pipe	Continuous	0.5 mg/L (instantaneous)

Total Coliform: For discharge to water supply reuse, at least 75% of the daily samples taken in any month shall be less than detection, and no single sample shall exceed 25 cfu/100 ml.

For blend pond reuse, 85% of the daily samples taken in any week shall be less than detection, and no single sample shall exceed 5 cfu/100 ml.

For all modes of direct reuse, such as water treatment plant reuse and pipe-to-pipe reuse all daily samples shall be less than detection.

Pathogens – Giardia and Cryptosporidium: For discharge to waters classified as water supply, reclaimed water shall be sampled quarterly for giardia and cryptosporidium. All samples thus collected and analyzed shall be less than detection for these parameters.

For blend pond reuse and for more direct modes of potable water reuse, reclaimed water shall be sampled monthly for giardia and cryptosporidium. All samples thus collected and analyzed shall be less than detection for these parameters.

Power: The water reclamation facility supporting potable water reuse shall have independent power feeds from two (2) separate substations plus onsite power generating capacity sufficient to operate equipment critical to the operation of the facility in compliance with all permit limits and requirements.

Redundancy: Design criteria for the water reclamation facility supporting discharge to water supply reuse and blend pond reuse shall provide multiple treatment units such that one (1) of the largest units may be out of service during peak flow day without exceeding the design loading range on the other units.

Design criteria for the water reclamation facility supporting water treatment plant reuse and pipe-to-pipe reuse shall provide multiple treatment units such that two (2) of the largest units may be out of service during a peak flow day without exceeding the design loading range on the other units.

Alternate Discharge or Effluent Storage: All potable water reuse water reclamation facilities will either have (a) an alternate discharge location for the rejected water which is suitable for discharge of the rejected water, or (b) one (1) peak day storage capacity for the rejected water, form which the rejected water may be retreated.

Influent Storage: All reuse reclamation facilities shall have at a minimum one (1) day's capacity of dedicated storage for untreated sewage either at the plant or at influent pumping stations.

FINISHED WATER QUALITY

Discharge to Water Supply Reuse: For discharge to water supply reuse, reclaimed water will not cause violations of water quality standards for the receiving water body in addition to the requirements in the Process Control Criteria and Pathogen – Giardia and Cryptosporidium Sections of this guideline. Priority pollutant and SDWA parameters shall be analyzed quarterly.

Blend Pond Reuse: For blend pond reuse, reclaimed water quality will meet or exceed the average water quality of the raw water source as measured at the intake for the preceding three months, in addition to the requirements in the Process Control Criteria and Pathogen – Giardia and Cryptosporidium Sections of this guideline. Priority

pollutant and SDWA parameters shall be analyzed monthly for both the reclaimed water and the water withdrawn from the blend pond.

Water Treatment Plant Reuse: For water treatment plant reuse, reclaimed water quality will meet or exceed the water quality of the raw water source on all primary Safe Drinking Water Act parameters at all times; in addition to the requirements in the Process Control Criteria and Pathogen – Giardia and Cryptosporidium Sections of this guideline. Priority pollutant and SDWA parameters shall be analyzed monthly for both the reclaimed water and the raw water.

Pipe-to-Pipe Reuse: For pipe-to-pipe reuse, reclaimed water quality will meet or exceed all Safe Drinking Water Act Primary Maximum Contaminant Level Goals and Secondary Maximum Contaminant Levels, and CWA priority pollutant levels in addition to the requirements in the Process Control Criteria and Pathogen – Giardia and Cryptosporidium Sections of this guideline. Priority pollutant and SDWA parameters shall be analyzed monthly for the reclaimed water.

RESIDUALS DISPOSAL

Potable reuse residuals disposal methods may include discharge to other surface water bodies if a liquid (provided that water quality standards are met in the receiving waters), or handled as a solid waste if it qualifies as a solid waste per solid waste regulations.

OPERATOR CERTIFICATION

At least one operator at the facility will have Class 1 certification in wastewater treatment and at least one operator will have Class 1 certification in water treatment.

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